Notice of Allowability	Application No.	Applicant(s)	
	09/579,276	FRAZER ET AL.	
	Examiner	Art Unit	
	Mary A. El-Shammaa	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *RCE filed 7/26/04*.
2. ☒ The allowed claim(s) is/are ~~*91-134*~~ 101 107 9-30 05.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *09/05* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Kurt T. Mulville on September 19, 2005.

The application has been amended as follows:

Claims 44-100 have been cancelled.

The following claims have been added:

101. An apparatus for delivering ions to a vacuum chamber comprising:

an enclosing ionization chamber including an ionization region and a vacuum interface at a vacuum interface voltage, wherein the vacuum interface allows the ionization chamber to communicate with the vacuum chamber;

first, second, and third electric field regions in the ionization chamber for transporting the ions through first, second, and third electric field regions and into the vacuum chamber;

an electrospray assembly at approximately ground potential having a dispensing end disposed within the ionization chamber;

a first electrode disposed sufficiently close to the dispensing end at a first electrode voltage of sufficiently high magnitude to form ions in the ionization region and to attract the ions from the ionization region;

a second electrode disposed in the ionization chamber at a second electrode voltage that repels the ion to a greater degree than the first electrode voltage; and

means for generating a gaseous stream in a gas flow path extending from the first electrode to the second electrode, wherein the gaseous stream provides the ion with sufficient velocity to overcome repulsion by the second electrode,

wherein the vacuum interface voltage is more attractive to the ion than the second electrode voltage.

102. The apparatus of claim 101, wherein the first electrode includes a first electrode aperture and the gas flow path extends from the first electrode aperture to the second electrode.

103. The apparatus of claim 101, wherein the second electrode includes a second electrode aperture and the gas flow path extends from the first electrode to the second electrode aperture.

104. The apparatus of claim 101, wherein the first and second electrodes each comprise a flat surface substantially parallel to each other.

105. The apparatus of claim 104, wherein the gas flow path is substantially orthogonal to the flat surfaces of the first and second electrodes.

106. The apparatus of claim 101, wherein the vacuum interface communicates with the vacuum chamber in a direction that intersects with the gas flow path.

107. The apparatus of claim 106, wherein the direction is substantially orthogonal to the gas flow path.

108. The apparatus of claim 101, wherein the first electrode, the second electrode, or both comprise a mesh portion.

109. The apparatus of claim 101, wherein the vacuum interface comprises an aperture in a plate.

110. The apparatus of claim 101, wherein the vacuum interface comprises a conduit having an axial bore.

111. The apparatus of claim 110, wherein the conduit is metallic.

112. The apparatus of claim 110, wherein the conduit is substantially electrically insulating.

113. The apparatus of claim 110, wherein the axial bore is a capillary or an orifice.

114. The apparatus of claim 101, wherein the means for generating a gaseous stream represents a component of the electrospray assembly.

115. The apparatus of claim 101, wherein the first and second electrode voltages have opposite polarity.

116. The apparatus of claim 101, wherein the first electrode voltage is positive.

117. The apparatus of claim 101, wherein the first electrode voltage is negative.

118. The apparatus of claim 101, wherein the interface voltage is approximately at ground.

119. The apparatus of claim 101, wherein the ionization chamber is electrically connected to the electrospray assembly.

120. The apparatus of claim 101, wherein the ionization chamber is at approximately atmospheric pressure.

121. The apparatus of claim 101, further comprising a scupper electrically attached to a downstream surface of the second electrode.

122. The apparatus of claim 121, wherein the scupper is at least partially constructed of mesh.

123. A method for delivering ions to a vacuum chamber comprising:

(a) providing:

(i) an enclosed ionization chamber including an ionization region;

(ii) first, second, and third electric field regions in the ionization chamber for transporting the ions through first, second, and third electric field regions and into the vacuum chamber;

(iii) an electrospray assembly having a dispensing end at approximately ground potential disposed within the ionization chamber; and

(iv) a vacuum interface that provides communication between the ionization chamber and the vacuum chamber;

(b) injecting a sample from the electrospray assembly into the ionization region;

(c) charging a first electrode within the ionization chamber to a sufficiently high ion-

attractive voltage to produce a sample ion in the ionization region;

(d) producing gas flow in a path extending from the first electrode to a second electrode having a second electrode voltage to transport the ion away from the first electrode and past a second electrode, wherein the second voltage is more repulsive to the ion than the first electrode voltage; and

(e) maintaining the vacuum interface at an interface voltage that is more attractive to the ion than the second electrode voltage such that the sample ion travels to the vacuum interface and into the vacuum chamber.

124. The method of claim 123, wherein the first electrode includes a first electrode aperture and the gas flow path extends from the first electrode aperture to the second electrode.

125. The method of claim 123, wherein the second electrode includes a second electrode aperture and the gas flow path extends from the first electrode to the second electrode aperture.

126. The method of claim 123, wherein the first and second electrodes each comprise a flat surface wherein the surfaces are substantially parallel to each other.

127. The method of claim 126, wherein the gas flow path is substantially orthogonal to the flat surfaces of the first and second electrodes.

128. The method of claim 123, wherein the vacuum interface communicates with the vacuum chamber in a direction that intersects with the gas flow path.

129. The method of claim 128, wherein the direction is substantially orthogonal to the gas flow path.

130. The method of claim 123, wherein the first electrode, the second electrode, or both comprise a mesh portion.

131. The method of claim 123, wherein the vacuum interface comprises an aperture in a plate.

132. The method of claim 123, wherein the vacuum interface comprises a conduit having an axial bore.

133. The method of claim 132, wherein the conduit is metallic.

134. The method of claim 132, wherein the conduit is substantially electrically insulating.

135. The method of claim 132, wherein the axial bore is a capillary or an orifice.

136. The method of claim 123, wherein the gas flow is produced by a component of the electrospray assembly.

137. The method of claim 123, wherein the first and second electrode voltages have opposite polarity.

138. The method of claim 123, wherein the first electrode voltage is positive.

139. The method of claim 123, wherein the first electrode voltage is negative.

140. The method of claim 123, wherein the interface voltage is approximately at ground.

141. The method of claim 123, wherein the ionization chamber is electrically connected to the electrospray assembly.

142. The method of claim 123, wherein the ionization chamber is at approximately atmospheric pressure.

143. The method of claim 123, further comprising providing a scupper electrically attached to a downstream surface of the second electrode.

144. A method for delivering ions to a vacuum chamber comprising:

(a) providing first, second, and third electric field regions in an ionization chamber, wherein each region has a direction;

(b) producing ions from a sample dispensed by an electrospray assembly at approximately ground potential into the ionization chamber; and

(c) transporting the ions in order through the first, second, and third electric field regions and into the vacuum chamber such that the ions travel in a direction that forms:

(i) a first angle with respect to the first electric field direction when the ions are in the first electric field region;

(ii) a second angle with respect to the second electric field direction when the ions are in the second electric field region; and

(iii) a third angle with respect to the third electric field direction when the ions are in the third electric field region,

wherein the first and third angles are each no greater than 90 degrees and the second angle is greater than 90 degrees.

Allowable Subject Matter

Claims 101-144 are allowed.

The following is an examiner's statement of reasons for allowance: regarding independent claims 101, 123, and 144, the prior art fails to teach or fairly suggest the following

in italics, in addition to the accompanying features of the claims an apparatus and method for delivering ions to a vacuum chamber comprising *an ionization chamber having first, second, and third electric fields regions being provided in an ionization chamber and transporting the ions through the first, second, and third electric field regions and into a vacuum chamber.* Claims 102-122 and 124-143 are allowable by virtue of their dependency.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary A. El-Shammaa whose telephone number is 571.272.2469. The examiner can normally be reached on M-F (8:30am-5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571.272.2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MAE
September 20, 2005

Frank G. Font
Supervisory Patent Examiner
Technology Center 2800